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US ARMY RESEARCH, DEVELOPMENT AND ENGINEERING COMMAND
AVIATION AND MISSILE RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER
5400 FOWLER RD
REDSTONE ARSENAL, AL 35898-5000

REPLY TO
ATTENTION OF

AMSRD-AMR-AE-D

25 March 2005

MEMORANDUM FOR Apache Attack Helicopter Project Management Office
(SFAE-AV-AAH-S), Building 5681, Redstone Arsenal, AL 35898-5000

SUBJECT: Airworthiness Release (AWR) for the AH-64D Apache Attack Helicopter for Use of the Night Vision Goggles (NVG) with the Symbology Display Unit (SDU) and the IHADSS NVG Visor Assembly in Combat Operational Theaters (AWR 2005D-A12)

1. References:

- a. Technical Manual 1-1520-251-10, Operator's Manual, AH-64D Helicopter, 29 March 2002, with changes.
- b. Memorandum, HQ USAAMCOM, AMSAM-AR-E-I-P-A, 17 May 1999, with changes, subject: Interim Statement of Airworthiness Qualification, AH-64D Longbow Apache Helicopter.
- c. Technical Manual 1-1520-APACHE/LONGBOW, Interactive Electronic Technical Manual (IETM), AH-64D Helicopter, 21 May 2004.
- d. Memorandum, HQ USARDECOM, AMSRD-AMR-AA-SC, 29 December 2004, subject: Test Report, New Night Vision Goggle (NVG) Visor and Symbol Display Unit (SDU) Integration onto an AH-64D Apache Integrated Helmet and Display Sighting System (IHADSS).
- e. Specification, EFW, Inc., 22 May 03, Engineering Specification Optical Assembly 92778A-00 Symbology Display Unit.
- f. Drawing, EFW Inc., Symbology Display Unit – (SDU), Drawing No. IH-013A-00.
- g. Specification, Gentex Corporation, 12 Nov 04, Product Specification for IHADSS NVG Visor Assembly.
- h. Drawing, EFW Inc., ASSY, IHADSS NVG Visor without NVG Mount, Drawing No. IH-016A-00.

NOTE

This AWR is temporary and does not render invalid any other AWRs currently covering the AH-64D helicopters indicated below.

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2. Scope: This memorandum constitutes an AWR in accordance with (IAW) Army Regulation (AR) 70-62 for the purpose of authorization to operate the AH-64D Apache Attack helicopter with night vision goggles (NVG) with the symbolology display unit (SDU) and the IHADSS NVG visor assembly. This AWR authorizes use of the SDU to units in combat theaters of operation, units conducting pre-deployment training, Directorate of Evaluation and Standardization, TRADOC Systems Manager for Recon/Attack and the Aviation Training Brigade for use in the development of tactics, techniques, and procedures as well as training development. The IHADSS visor is not limited to the previous list and may be used by all AH-64D equipped units.

NOTE

Any deviation from installation instructions as stated herein, is not authorized.
Any deviation from installation instructions shall void this AWR.

3. Configuration:

- a. The basic AH-64D helicopter is defined in reference 1a as modified by reference 1b.
- b. The SDU is defined in references 1e and 1f. A decision must be made prior to flight whether the SDU or HDU will be used since the SDU uses the same connectors on the display adjustment panel (DAP).
- c. The IHADSS NVG visor assembly is defined in references 1g and 1h.

4. Operations and Restrictions:

WARNING

Significant errors in aiming may occur if the HMD is used as a sight while using NVGs without a valid boresight. Failure to have a valid boresight may result in the death or damage to unintended targets and or fratricide. Use of the HMD as a sight without a valid boresight while using NVGs and the SDU is prohibited.

WARNING

SDU use is restricted to one crew member. Sufficient EMI/EMC testing has not been accomplished to determine if the flight critical information displayed by the SDU is affected by electromagnetic environments.

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CAUTION

Overlaying FLIR imagery on NVG imagery is not useable for pilotage and shall not be used for flying the aircraft. To preclude this condition, place the NVS switch in the OFF position while the SDU is in use in a crew station.

CAUTION

The SDU cable has the potential to catch on other objects in the cockpit. Use of the SDU cable clamp is recommended.

CAUTION

The cable on the SDU in the configuration called out in reference 1f is different than what was tested. The modified SDU cable has not been evaluated. Testing of the prototype SDU cable configuration has shown that the tension on SDU cable can cause the SDU symbology to shift/rotate during flight. Testing is required to determine if the new cable configuration has corrected this problem.

CAUTION

Any interference (physical or operational) between this installation and other installations may damage the equipment and precipitate a more serious condition. Interference shall be corrected prior to continued installation or subsequent operation in flight. Report interference to the POC in paragraph 8 for resolution.

NOTE

Under high ambient light conditions the SDU symbology becomes washed out and hard to see.

NOTE

The SDU collar does not fully enclose the NVG tube. Ambient light sources behind the aircraft may be reflected off the SDU lens into the NVG tube and may cause distraction.

NOTE

Adjustments in the video brightness and contrast will change the symbology focus requiring a focus adjustment on the DAP which is inaccessible during flight.

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NOTE

All the information fields in the high action display (HAD) may not be viewable. If the HAD is not viewable, the HAD should be confirmed on the multifunctional display (MPD) prior to weapons engagements.

- a. The aircraft operating instructions, procedures, and limitations shall be IAW reference 1a, 1b, and this document. In the event of conflict between these documents, the information in this AWR shall prevail.
- b. A weight and balance form must be executed or be on file per AR 95-1.
- c. SDU Installation and Boresight Procedures:

CAUTION

Removal of the HDU and installation of the SDU with aircraft power applied may result in damage to critical components. If aircraft power is applied, the IHADSS system should be turned off and the IHADSS circuit breaker should be pulled.

CAUTION

The NVG tilt lever must be in the fully down position to achieve and maintain helmet boresight. If the NVGs are subsequently adjusted, the boresight procedure must be repeated. Use of the NVG Tilt block is recommended.

NOTE

Use of the SDU requires the IHADSS NVG visor to achieve a valid boresight.

NOTE

The BRU center concentric circles will not be visible but will appear as a round glow. Reduction of primary instrument panel lights (PRI INT LT) to the minimum level will reduce the glow. The LOS must be placed in the center of the round glow to achieve a proper boresight.

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NOTE

The NVG tube objective focus should be adjusted prior to fitting the SDU. Care should be taken not to inadvertently change the objective focus when fitting the SDU.

NOTE

SDU video brightness and contrast should be optimized prior to symbology electronic focus. Optimum focus will not be as crisp as when the symbology is viewed through the HDU. Electronic focus may require re-adjustment as the eye becomes accustomed to the image.

- (1) Remove the HDU and replace with SDU.
- (2) Conduct NVG optimization IAW (NVG -10).
- (3) Install SDU.
- (4) Conduct SDU optimization as follows:
 - (a) Turn symbology brightness full bright.
 - (b) Turn the video brightness full down.
 - (c) Adjust video contrast until symbology is set to desired level (may require minor adjustments in video brightness).
 - (d) Readjust symbology brightness.
 - (e) Focus symbology using focus pot on the display adjust panel.
 - (f) Adjust image rotation using the adjustment knob on the SDU.
- (5) Conduct symbology sizing and centering adjustment.
- (6) Conduct IHADSS Boresight.

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5. Special Inspections and Instructions:

a. In addition to normal inspections, a one time qualitative Electromagnetic Compatibility (EMC) test shall be conducted on the first aircraft installation prior to first flight of the newly installed equipment to demonstrate that the newly installed equipment (including any test instrumentation) does not serve as sources or victims of electromagnetic interference with the existing electrical/electronic subsystems. Aircraft similar in configuration to the one(s) tested do not require a repeat of this test. This shall be accomplished by monitoring the performance of all new and existing subsystems as the individual subsystems are operated in-turn. The operation of this equipment must include a power-on/power-off cycle, initializing or warm-up (if applicable), and all modes of operation. All equipment shall be in the "in flight" configuration and shall be operated using aircraft generated power. Any EMC anomalies shall be reported by telephone to the POC in paragraph 8 prior to next flight. The aircraft shall not be considered airworthy unless the tests demonstrate that the newly installed equipment (including any test instrumentation) does not serve as sources (initiators) or recipients of electromagnetic interference. In addition to any phone report, a letter report confirming completion of EMC test will be submitted to the POC in paragraph 8, not more than 10 days after the test.

b. This Command has no responsibility for establishing or maintaining any logistics support for the nonstandard equipment or system installation. All logistics support required to be provided for such equipment/system installation must be established and maintained by the operating unit with appropriate, locally established, support activities. Parts needed for this modification may not be available in the supply system. Your activity/facility must locally procure/manufacture the modification parts (plus any additional spare parts). To procure these items, contact Thomas Fite of EFW Inc. at (817) 234-6960 or email: tfite@efw.com. The company mailing address is 4700 Marine Creek Parkway, P.O. Box 136969, Fort Worth, TX 76136. This Airworthiness Release is not authorization to procure any material or sources "Sole Source."

c. In the event any operating limit, or limits established by this release, is exceeded in addition to the normal entry on DA Form 2408-13, appropriate inspection plus special inspection for security and condition of modifications shall be performed prior to next flight. Any incident or malfunction of the aircraft suspected of being related to these configuration modifications shall be reported immediately to the POC in paragraph 8.

d. The aircraft shall be inspected and maintained IAW all applicable maintenance manuals and associated Maintenance Advisory and Safety of Flight Messages. Any discrepancies shall be evaluated/repaired prior to the next flight to ensure continued airworthiness of the helicopter.

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e. Ensure all new cables have been routed and clamped to assure protection from physical abuse, such as being stepped on, door slammed on, or used as a hand hold. Ensure the cables are adequately protected from vibration, chafing, or stretching. Cables shall not be clamped to control tubes or cables, fuel lines, or hydraulic lines

f. The SDU has undergone limited testing and several shortcomings have been identified. In an effort to further refine the SDU design, request units provide feedback to the POC in paragraph 8. Feedback can be provided via email or voice. No formal report format or reporting period is required. At the time of reporting it is requested that the user provide name, unit, time of operation with the SDU, and issue. The issues identified can be related to setup, operational use, operational utility, or even a design enhancement.

6. Aircraft Logbook Entries:

NOTE

Unit Level Logistics System-Aviation users shall use the equivalent electronic form.

a. In accordance with Department of the Army (DA) Pamphlet 738-751, the following entries shall be made on the DA Form 2408-13-1 and shall be perpetuated on each form during the period of installation or until superseded by another airworthiness release, or until reason for limitation is removed.

(1) Place a circled red "X" on the form IAW DA Pamphlet 738-751. In the Fault Information Block make the following entry: "Operate within limitations and restrictions specified in the enclosed airworthiness release dated **25 Mar 05**."

(2) Place a red dash in the status block to be followed in the fault remarks block with "EMC test required on the first aircraft installation prior to the next flight IAW the enclosed airworthiness release dated **25 Mar 05**." Upon successful completion of the required test, the red dash can be cleared for all aircraft of the same configuration.

b. An exact copy of this AWR describing the operating procedures, limitations, and restrictions will be inserted in the aircraft logbook and another copy inserted in the Aircraft Historical Record File.

c. The aircraft DA Form 2408-15 shall be annotated to reflect the successful completion of the EMC test and to cite this airworthiness release by subject and date. The 2408-15 needs to be annotated to reflect temporary installations, as well as, permanent changes to configuration.

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d. For DA Form 1352 reporting purposes, the above write-ups shall not cause the aircraft to be reported as Partially Mission Capable (PMC). Aircraft which are nonstandard configured and operating under this release may be reported as Fully Mission Capable (FMC).

7. This Airworthiness Release is in affect until rescinded or upon issuance of a later Airworthiness Release, whichever comes first.

8. The point of contact for this AWR is Mr. Randy Robinson, AMSRD-AMR-AE-D, at E-mail: randy.robinson@amrdec.army.mil or (256) 705-9857, DSN 897-2350, extension 9857.


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